

1-5
 6-10
 11-15
 method < 1/5 1-7
 protein < 1/5 8-15
 NA < 1/5 16-28
 vector < 1/5 16-22
 cell

1620 methodology
 protein 10/625882
 1-28

OR File No. 15493-1US-1

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WHAT IS CLAIMED IS:

1. A method for improving supplying of at least one essential amino acid to a human or an animal or endowing a human or an animal with at least one essential amino acid, comprising administering to said human or animal at least one polypeptide or a nucleic acid sequence encoding said polypeptide, said polypeptide having amino acid sequence consisting of at least one of SEQ ID NO:1 to SEQ ID NO:5 or a fragment thereof, in which at least one leucine at position 19, 45 or 68, one asparagine at position 44, or one alanine at position 31, 35, 59, 80, or 84 of said at least one SEQ ID NO:1 to SEQ ID NO:5 is substituted with a different amino acid.
2. The method of claim 1, wherein said at least one leucine is substituted with a glutamic acid, an aspartic acid, a valine, an isoleucine, a methionine, or a phenylalanine, said asparagine is substituted with a glutamic acid, or said alanine is substituted with a valine, an isoleucine, a phenylalanine, a leucine, or a methionine.
3. The method of claim 1, wherein said functional fragment comprises between 10 and 90 amino acids.
4. The method of claim 1, wherein said administration is an oral administration.
5. The method of claim 1, wherein said nucleic acid sequence is a DNA or a RNA sequence.
6. The method of claim 1, wherein said SEQ ID NO:1 to SEQ ID NO:5 have additionally at least one tryptophane at position 62, leucine at position 13 or 91, or methionine at position 10 or 87 substituted with another amino acid.

7. The method of claim 6, wherein said tryptophane is substituted with a tyrosine, said leucine at position 13 or 91 is substituted with a cysteine and said methionine is substituted with a cysteine.

8. A composition for improving supplying of at least one essential amino acid to a human or an animal or endowing a human or an animal with at least one essential amino acid, said composition comprising at least one polypeptide having amino acid sequence consisting of at least one of SEQ ID NO:1 to SEQ ID NO:5 or a fragment thereof, or a nucleic acid sequence encoding said polypeptide or fragment thereof, having at least one substituted amino acid as described in claim 1

9. The composition of claim 8, wherein said essential amino acid is a methionine, lysine, threonine, leucine, tryptophan, arginine, an analog or a derivative thereof.

10. The composition of claim 8, wherein said SEQ ID NO:1 to SEQ ID NO:5 have additionally at least one tryptophane at position 62, leucine at position 13 or 91, or methionine at position 10 or 87 substituted with another amino acid.

11. The composition of claim 10, wherein said tryptophane is substituted with a tyrosine, said leucine at position 13 or 91 is substituted with a cysteine and said methionine is substituted with a cysteine.

12. A polypeptide consisting of an amino acid sequence selected from the group consisting of SEQ ID NO:1 to SEQ ID NO:5 or a functional fragment thereof, in which at least one leucine at position 19, 45 or 68, one asparagine at position 44, or one alanine at position 31, 35, 59, 80, or 84 of at least one of said SEQ ID NO:1 to SEQ ID NO:5 is substituted with a different amino acid.

13. The polypeptide of claim 12, wherein said essential amino acid is a methionine, lysine, threonine, leucine, tryptophan, arginine, an analog or a derivative thereof.

14. The polypeptide of claim 12, wherein said SEQ ID NO:1 to SEQ ID NO:5 have additionally at least one tryptophane at position 62, leucine at position 13 or 91, or methionine at position 10 or 87 substituted with another amino acid.

15. The polypeptide of claim 14, wherein said tryptophane is substituted with a tyrosine, said leucine at position 13 or 91 is substituted with a cysteine and said methionine is substituted with a cysteine.

16. A nucleotide sequence encoding for a polypeptide as described in claim 13.

17. The nucleotide sequence of claim 16 being a DNA or a RNA sequence.

18. A nucleotide sequence selected from the group consisting of, SEQ ID NO:6 to SEQ ID NO:10, in which at least one codon is mutated to allow synthesis from said nucleotide sequence a polypeptide as described in claim 12.

19. An expression vector comprising a nucleotide sequence as described in claim 12.

20. An expression vector comprising a nucleotide sequence as described in claim 18.

21. A cell transformed with the expression vector as described in claim 19.

22. A cell transformed with the expression vector as described in claim 20.

23. A method for improving physical, biochemical or biological property of a polypeptide having amino acid sequence consisting of at least one of SEQ ID NO:1 to SEQ ID NO:5 or a fragment thereof, comprising substituting at least one leucine at position 19, 45 or 68, one asparagine at position 44, or one alanine at position 31, 35, 59, 80, or 84 of at least one of said SEQ ID NO:1 to SEQ ID NO:5 with a different amino acid.

24. The method of claim 23, wherein said at least one leucine is substituted with a glutamic acid, an aspartic acid, a valine, an isoleucine, a methionine, or a phenylalanine, said asparagine is substituted with a glutamic acid, or said alanine is substituted with a valine, an isoleucine, a phenylalanine, a leucine, or a methionine.

25. The method of claim 23, wherein said property is resistance to temperature or to proteolysis.

26. The polypeptide of claim 23, wherein said essential amino acid is a methionine, lysine, threonine, leucine, tryptophan, arginine, an analog or a derivative thereof.

27. The polypeptide of claim 23, wherein said SEQ ID NO:1 to SEQ ID NO:5 have additionally at least one tryptophane at position 62, leucine at position 13 or 91, or methionine at position 10 or 87 substituted with another amino acid.

28. The polypeptide of claim 27, wherein said tryptophane is substituted with a tyrosine, said leucine at position 13 or 91 is substituted with a cysteine and said methionine is substituted with a cysteine.